REMARKS

This paper is filed in response to the Office Action mailed December 30, 2010 (the "Office Action").

Following the amendments above, claims 1-15 and 33-38 are pending in the application. Claims 1-7, 12, and 33-38 were rejected under 35 U.S.C. § 112 ¶ 2 as allegedly being indefinite. Claims 1-15 and 33-38 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent 6,002,184 to Delson et al ("Delson") in view of U.S. Patent No. 6,005,551 to Osborne et al ("Osbourne"), U.S. Patent No. 6,625,576 to Massie et al ("Massie"), and U.S. Patent No. 5,754,023 to Roston et al ("Roston").

Applicant has amended claim 1-3, 5-8, 33, and 34. No new matter is added by these amendments and support may be found in the specification and claims as originally filed.

Applicant traverses each of the Examiner's rejections of the claims and respectfully requests reconsideration and allowance of all claims in view of the amendments above and the remarks below.

I. Interview Summary

Applicant thanks the Examiner for his time during the telephonic interview with Applicant's representative Carl Sanders on March 1, 2011. The parties discussed "calculate an adjusted sensor value based at least in part on the raw sensor value and a compliance between the sensor and the manipulandum" as allegedly disclosed by Delson, Osborne, Massie, and Roston. The parties did not reach an agreement. The parties further discussed the rejection of claim 12 under 35 U.S.C. § 112 ¶ 2. The parties did not reach an agreement on this issue either.

II. Claim Amendments

Applicant has amended independent claims 1, 8, and 33 to recite "an adjusted sensor value based at least in part on the raw sensor value and a compliance constant, the compliance constant predetermined based on a compliance between the sensor and the manipulandum." Support for this amendment may be found in the specification and claims as originally filed. For

example, paragraph 67 discloses such a feature. Applicant has amended claims 2 and 34 to correspond to the amendments made to claims 1 and 33.

III. § 101 – Claims 1-7, 12, and 33-38

Claims 1, 3, 5, 6, and 7 were each individually rejected under 35 U.S.C. § 101 for reciting a use of a processor, but not setting forth any method steps. In addition, claims 2 and 4 were rejected under 35 U.S.C. § 101 as being dependent from claim 1. Applicant has amended claim 1 to recite a method having steps performed by a processor in communication with a computer-readable medium. Thus, Applicant respectfully asserts that claims 1, 3, 5, 6, and 7 each include method steps and thus is directed to statutory subject matter. Applicant respectfully requests the Examiner withdraw the rejection of claims 1, 3, 5, 6, and 7. Further, because claim 1 is directed to statutory subject matter, each of claims 2 and 4 is likewise directed to statutory subject matter. Applicant respectfully requests the Examiner withdraw the rejection of claims 2 and 4.

IV. § 112 ¶ 2 – Claims 1-7, 12, and 33-38

Claims 1, 3, 5, 6, and 7 were rejected under 35 U.S.C. § 112 ¶ 2 as allegedly omitting structural relationships between the recited processor elements. Applicant has amended claims 1, 3, 5, 6, and 7 to clarify the structural relationships between the processor elements. Applicant respectfully asserts that claims 1, 3, 5, 6, and 7 satisfy 35 U.S.C. § 112 ¶ 1. Applicant respectfully requests the Examiner withdraw the rejection of claims 1, 3, 5, 6, and 7.

Claim 12 was rejected under 35 U.S.C. § 112 ¶ 2 as allegedly omitting essential structural cooperative relationships for reciting "a relative digital encoder." In response, Applicant asserts the claimed "relative digital encoder" is a type of digital encoder, namely one that senses relative positions or movement, in contrast to an "absolute digital encoder," which senses absolute positions or movement. Specifically, the term "relative" is not an indication of the placement of the digital encoder within a device, but rather the type of digital encoder.[1] Thus, Applicant asserts that claim 12 satisfies the requirements of 35 U.S.C. § 112 ¶ 2. Applicant respectfully requests the Examiner withdraw the rejection of claim 12.

[1] See Exhibit A, accessed on March 1, 2011.

Claim 33 was rejected under 35 U.S.C. § 112 ¶ 2 as allegedly omitting a structural cooperative relationship. Applicant has amended claim 33 to recite "[a] non-transitory computer-readable medium on which is encoded program code configured to cause a processor to execute a method." Applicant respectfully asserts that in view of the amendments above, the preamble of claim 33 is clear and provides all necessary structural cooperatie relationships and therefore satisfies the requirements of 35 U.S.C. § 112 ¶ 2. Applicant respectfully requests the examiner withdraw the rejection of claim 33. Further, because claims 34-38 were rejected as being dependent from a rejected base claim, Applicant respectfully requests the Examiner withdraw the rejection of claims 34-38.

V. § 103(a) – Claims 1-15 and 33-38 – Delson in view of Osborne, Massie, and Roston

Applicant respectfully traverses the rejection of claims 1-15 and 33-38 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Delson in view of Osborne, Massie and Roston.

To anticipated a claim under 35 U.S.C. § 102, a reference must disclose each and every element of the claimed invention.[2]

To establish *prima facie* obviousness of a claimed invention under 35 U.S.C. § 103(a), the Office Action must show, either from the references themselves or in the knowledge generally available to one of ordinary skill in the art, that the cited references disclose or suggest each claimed element.[3]

The Office Action provides several alternative rejections of claim 1:

(1) Anticipation by Delson (presumably under 35 U.S.C. § 102)

(2) Obvious over Delson in view of Osborne

(3) Obvious over Delson in view of Osborne and Massie

(4) Obvious over Delson in view of Osborne, Massie, and Roston

However, the Office Action fails to state a *prima facie* case of anticipation or obviousness for each basis of rejection. Applicant maintains its arguments made in the previous response to Office Action filed October 18, 2010. For those reasons, the previously-pending claims were patentable over the references cited by the Examiner.

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[2] See M.P.E.P. § 2131.
[3] See MPEP §§ 2141 and 2143; Graham v. John Deere Co., 383 U.S. 1 (1966); KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398 (2007).

Further, Applicant has amended claims 1, 8, and 33 to recite "an adjusted sensor value based at least in part on the raw sensor value and a compliance constant, the compliance constant predetermined based on a compliance between the sensor and the manipulandum." Because neither Delson alone nor in combination with any of Osbourne, Massie, or Roston discloses or suggest such a feature. As discussed in the prior response to Office Action, δx does not represent an adjusted sensor value. Rather, δx discloses the difference between the sensed position of a driven system with the desired position.[4] The error, or difference, disclosed by Delson is not a sensor value and thus cannot be an adjusted sensor value.

However, even assuming that δx is an adjusted sensor value, Delson does not disclose "an adjusted sensor value based at least in part on the raw sensor value and a compliance constant, the compliance constant predetermined based on a compliance between the sensor and the manipulandum" as recited in claim 1. Therefore claim 1 is patentable over Delson. Similarly none of Osborne, Massie or Roston disclose such a feature. Thus, the scope and content of the combination of Delson, Osborne, Massie, and Roston does not disclose "an adjusted sensor value based at least in part on the raw sensor value and a compliance constant, the compliance constant predetermined based on a compliance between the sensor and the manipulandum" as recited in claim 1. Therefore claim 1 is patentable over Delson in view of Osborn, Massie, and Roston. Applicant respectfully requests the Examiner withdraw the rejection of claim 1.

Because claims 8 and 33 each recite ""an adjusted sensor value based at least in part on the raw sensor value and a compliance constant, the compliance constant predetermined based on a compliance between the sensor and the manipulandum," claims 8 and 33 are each patentable over Delson in view of Osborn, Massie, and Roston for at least the same reasons. Applicant respectfully requests the Examiner withdraw the rejection of claims 8 and 33.

Because claims 2-7, 9-15 and 34-38 depend from and further limit one of claims 1, 8, and 33, each of claims 2-7, 9-15, and 34-38 is patentable over Delson in view of Osborn, Massie, and Roston for at least the same reasons. Applicant respectfully requests the Examiner withdraw the rejection of claims 2-7, 9-15, and 34-38.

[4] Delson, 35:40-44.

CONCLUSION

Applicant respectfully asserts that in view of the amendments and remarks above, all pending claims are allowable and Applicant respectfully requests the allowance of all claims.

Should the Examiner have any comments, questions, or suggestions of a nature necessary to expedite the prosecution of the application, or to place the case in condition for allowance, the Examiner is courteously requested to telephone the undersigned at the number listed below.

Respectfully submitted,

Date: March 8, 2011

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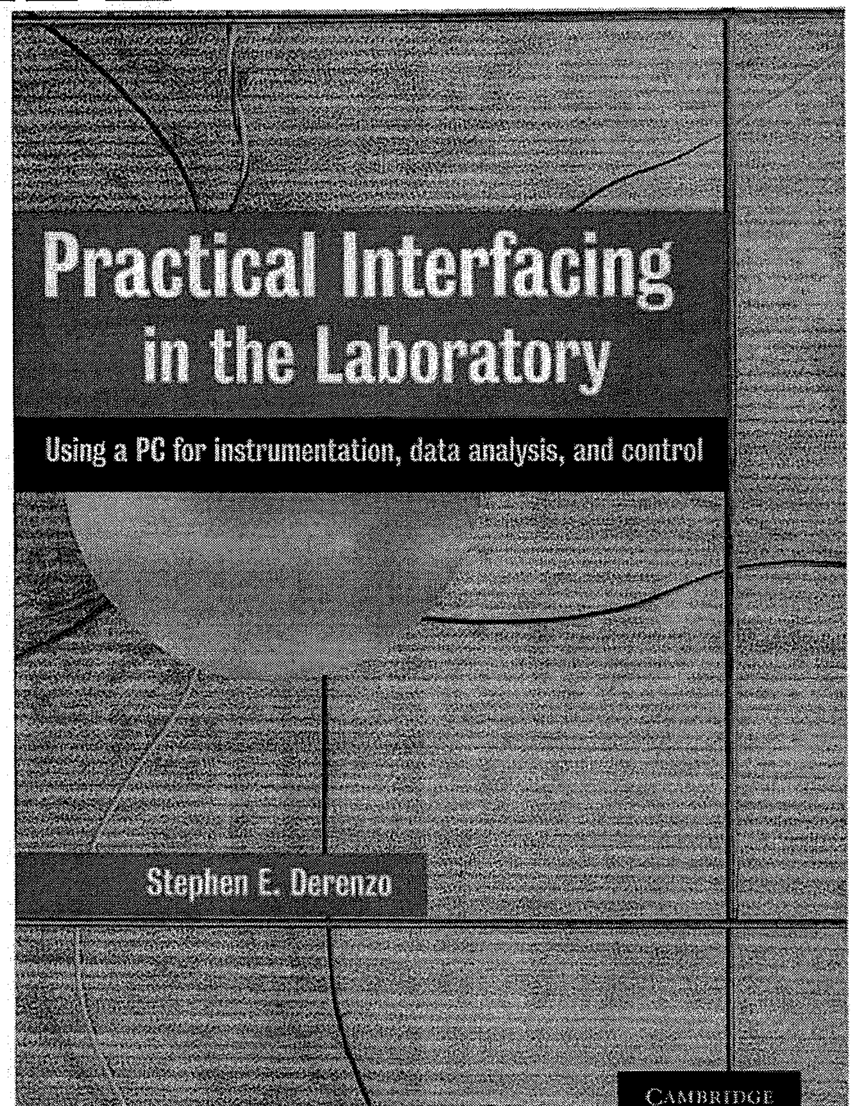

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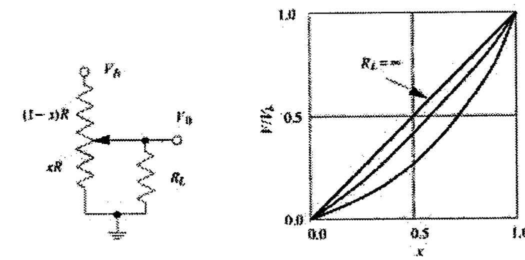

Figure 4.3 Linear resistive position sensor without linearization.

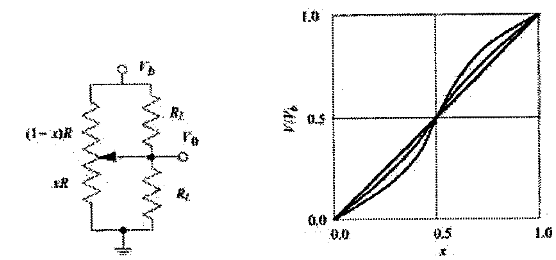

Figure 4.4 Linear resistive position sensor with linearization.

that the output is constrained to read correctly at mid-range.

$$V_0 = V_b \frac{xR \| R_L}{(1-x)R + xR \| R_L} = V_b \frac{xR_L}{R_L + xR(1-x)}$$

When $x = 0.5$, then $V_0 = V_b \frac{2R_L}{4R_L + R}$

$R_L = R$ and $x = 0.5$, then $V_0 = 0.4V_b$

4.2.2 The digital encoder

The digital encoder provides a very precise conversion from a shaft angle (or a linear position) to a digital number. There are two basic types. The relative digital encoder consists of a disk (or strip) with a pattern of uniformly spaced marks and a sensor that detects the marks and produces pulses as the strip is rotated (or translated). The pulses are counted to give a number whose value is proportional to relative angle (or position). A battery-powered circuit can be used to keep track of absolute position during power shutdowns.

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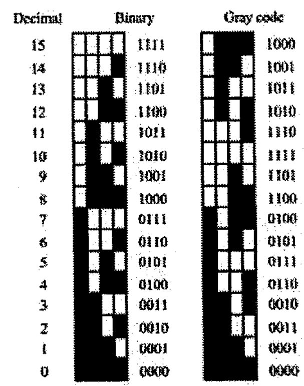

Figure 4.5 Digital encoder patterns for linear position sensing. The dark portion of the patterns represents a "zero" (blocks light) and the white portion of the patterns represents a "one" (lets light through). The pattern on the left is binary code, where the rightmost strip is the LSB and the leftmost strip is the MSB. The pattern on the right is Gray code, where only one bit switches at a time to avoid ambiguities at transition points.

The **absolute** digital encoder has a series of patterns of marks that can be uniquely related to the absolute angle (or position). The absolute-position encoder keeps track of absolute position during power shutdowns without the need for additional circuitry.

Early designs of absolute-position encoders used circular patterns of insulating and conducting regions. The conducting regions were detected by electrical contacts made by "brushes" (similar to those in small electric motors), and these encoders are called "brush encoders." The primary problem with the brush encoder is bit errors due to dust, oil, oxide layers, and the occasional loss of electrical contact with the rotating surface. Modern "optical encoders" use patterns of opaque and transparent regions, where the transparent regions are detected optically (using light-emitting diodes and silicon photodiodes).

Digital linear encoder

If the pattern is arranged in a binary code, as shown on the left-hand side of Figure 4.5, and an array of light-emitting diodes and photodiodes are placed on opposite sides of the pattern as shown in Figure 4.6, the angular position is transformed to a series of "zeros" and "ones," depending on whether light can pass through the segments of the pattern. However, many bits can switch at a single transition (e.g. between 01111 and 10000), and since there is no way of ensuring that all bits will switch at exactly the same instant, it is possible to read an incorrect code at the transition. Adding an